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III. "On the Tides of the Arctic Seas.—Part II. The Semi-diurnal Tides of Port Leopold, North Somerset." By the REV. SAMUEL HAUGHTON, M.A., F.R.S., Fellow of Trinity College, Dublin. Received October 8, 1862.

(Abstract.)

The first part of the author's researches on the Tides of the Arctic Seas was forwarded to the Royal Society in November 1861, and contained the discussion of the Diurnal Tides of Port Leopold. In the present communication the Semidiurnal Tides of the same port are discussed, and the following results obtained. The eccentricity of the moon's orbit is calculated from the parallactic inequality, and found to be 0.5303.

The solitidal interval is 56<sup>m</sup>.

The lunital interval 4<sup>h</sup> 54<sup>m</sup>.

The ratio of the solar to the lunar coefficient is found to be 0.3956.

The mass of the moon  $\frac{1}{71.11}$ th.

And the depth of the Atlantic is calculated from received tidal theories. The most probable results are found to be,—

From semidiurnal tidal intervals . . 3.529 miles.

From diurnal coefficients . . . . 3.690 „

There are other values of the depth of the sea, much greater than these, which follow from other considerations of the tidal theory; and the author is unable to explain why theory should give results so different. The preceding, however, he believes to be most in accordance with facts.

IV. "On the Action of Chloride of Iodine on Iodide of Ethylene and Propylene Gas."—Second Notice. By MAXWELL SIMPSON, M.B., F.R.S. Received October 23, 1862.

In my last communication to the Society\* I announced that a body having the composition expressed by the formula  $C_4H_4I_2Cl$  was formed when iodide of ethylene was subjected to the action of chloride of iodine. I have since ascertained that the same body may be obtained by the direct action of ethylene gas on the latter reagent. By this process it can be prepared in large quantity with great facility.

\* Proceedings, vol. xi. p. 590.

It is only necessary to pass the gas into a watery solution of the chloride of iodine, wash the reddish oil which collects at the bottom of the solution with dilute potash, and distil. The portion which passes over at about  $145^{\circ}$  Cent. is pure chloriodide of ethylene.

The specific gravity of the chloriodide at zero is 2.151. Heated with an alcoholic solution of potash, it suffers decomposition, iodide of potassium being formed, and a gas given off which burns with a green flame. This is no doubt chloride of aldehydene ( $C_4H_3Cl$ ). This reaction goes far to prove that the true constitution of this body is represented by the formula  $C_4H_3Cl$ ,  $HI$ , and not by the formula  $C_4H_3I$ ,  $HCl$ , proposed in my former paper.

Propylene gas derived from glycerine also yields an oil when passed into a solution of chloride of iodine, as I have already stated. In order to purify this, I found it necessary to distil it *in vacuo*, rejecting what came over at the beginning and towards the end of the process. The numbers I obtained on analysing this body prove its composition to be  $C_6H_6ICl$ .

Chloriodide of propylene, as I may call this compound, is when freshly prepared a colourless oil, having an ethereal odour and a sweet taste. Its specific gravity at zero is 1.932. When an effort is made to distil it under atmospheric pressure, it suffers decomposition, hydriodic acid being evolved in large quantity. Mixed with an alcoholic solution of potash and distilled, it yields iodide of potassium and an oily liquid (contained in the distillate and separable from it by water) which is very volatile and burns with a green flame. This is doubtless chloride of allyle ( $C_6H_5Cl$ ).

The oil formed by the action of chloride of iodine on propylene gas obtained from amylic alcohol, I have not been able to obtain in a fit state for analysis.

The application of the foregoing process to other hydrocarbons would no doubt place in our hands many similar compounds.

V. "On certain Developable Surfaces." By A. CAYLEY, Esq.

Received October 25, 1862. Read November 27, 1862.

(Abstract.)

If  $U=0$  be the equation of a developable surface, or say a developable, then the hessian  $HU$  vanishes, not identically, but only by virtue of the equation  $U=0$  of the surface; that is,  $HU$  contains  $U$  as a